UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,626	02/25/2002	Kadagattur Srinidhi	PXL-042 (6573/48)	3696

21323 7590 12/13/2004

TESTA, HURWITZ & THIBEAULT, LLP
HIGH STREET TOWER
125 HIGH STREET
BOSTON, MA 02110

EXAMINER	
CASCHERA, ANTONIO A	

ART UNIT	PAPER NUMBER
2676	

DATE MAILED: 12/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/084,626	SRINIDHI ET AL.	
	Examiner	Art Unit	
	Antonio A Caschera	2676	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-8 and 11-16* is/are rejected.

7)☒ Claim(s) *4,5,9,10,17 and 18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 May 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. Receipt is acknowledged of a request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e) and a submission, filed on 10/1/2004.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 6-8 and 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mutoh et al. (U.S. Patent 6,631,210 B1) in view of Ng (U.S. Patent 5,502,793).

In reference to claim 1, Mutoh et al. discloses an image processing apparatus and method for discriminating between character areas and mesh areas as well as between black and white character areas with high precision (see abstract, lines 1-2 and last 5 lines). Note, the office interprets the mesh areas of Mutoh et al. equivalent to the content representing graphics of applicant's claim. Mutoh et al. discloses a second embodiment having an image area discrimination circuit comprised of multiple line memories (see #101c, 101m and 101y of Figure 18) as well as a color judgment circuit (see #102 of Figure 18) which receives a plurality of image data, in the form of pixel data, from the line memories (see column 29, lines 17-24 and 51-60). Mutoh et al. discloses a density difference sum calculation circuit which calculates an

addition of the sum of absolute values of density level differences between pixels adjacent in the scanning direction within a specific area (see column 30, lines 32-37). Note, the office interprets the applicant's, "spatial gradients" equivalent to the, "density differences" of Mutoh et al. Mutoh et al. also discloses calculating a density difference average (see column 30, lines 13-23) using the density differences of a specific area. Note, the office interprets the applicant's, "smoothness index" equivalent to the, "density difference average" of Mutoh et al. because spatial connectivity of pixels is related to the gradient of an image. Mutoh et al. discloses testing the density difference average against a threshold value to produce a control signal which is later used in determining whether a black character area or an area other than a black character area is present (see column 31, lines 20-26 and columns 31-32, lines 65-13). Mutoh et al. does not explicitly disclose calculating the density difference average using density differences which are based on one or more non-linear statistical characteristics. Ng discloses detecting and enhancing image edges by calculating gradient magnitude changes of lines or text within the image (see columns 1-2, lines 65-8). Ng discloses calculating a gradient magnitude by taking the square root of the sum of the square of x and y pixel values (see column 4, lines 18-20 and 25). Note, the office interprets the "non-linear statistical characteristics" of applicant's claim equivalent to the square root of the sum of the square of x and y pixel values (see column 4, line 25 of Ng) when calculating the gradient magnitude in Ng. Further note, the office makes the above interpretation based on the applicant's remarks (see page 10 of Remarks, filed 10/1/04), wherein the applicant gives an example of using a non-linear statistic in the equation of page 10, which uses sums of square roots of pixel values. Ng further discloses using the gradient magnitude to determine whether a central pixel of a window of an image is black or white (see column 4, lines

59-66). It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the non-linear gradient calculation techniques of Ng with the density difference, character discrimination techniques of Mutoh et al. in order to detect and enhance edge information in low resolution images using a flexible high speed system (see columns 1-2, lines 65-1 of Ng).

In reference to claims 2, 7 and 15, Mutoh et al. and Ng disclose all of the claim limitations as applied to claims 1, 6 and 14 respectively. Mutoh et al. discloses calculating the density difference sums by calculating the sum of absolute values of differences between target pixels and peripheral pixels (see column 9, lines 47-50 and Figures 8a and 8b).

In reference to claims 3, 8 and 16, Mutoh et al. and Ng disclose all of the claim limitations as applied to claims 1, 6 and 14 respectively. Mutoh et al. discloses calculating a density difference average (see column 30, lines 13-23) obtained from the sum of density differences and the number of density-coincident pixels (of the number of pixels that have the same density value as a target pixel) (see column 9, lines 50-56). Note, the office interprets the sum of density differences equivalent to a second statistical characteristic of density values and the number of density-coincident pixels equivalent to a first statistical characteristic of density values. Further, the office believes Mutoh et al. inherently teaches dividing the second statistical characteristic by the first to generate a smoothness index as computing an average value (density difference average) is known in mathematics to utilize a division operation.

In reference to claim 6, claim 6 is equivalent in scope to claim 1 and therefore is rejected under similar rationale in addition, Mutoh et al. discloses receiving a second plurality of pixel data (pixel data for color component M) from the line memories (see column 29, lines 51-60).

Mutoh et al. discloses a color feature amount extraction circuit (#121 of Figure 19) utilizing the second plurality of pixel data, along with a first and third plurality of pixel data, to produce a minimum value calculation (see columns 29-30, lines 63-12). Mutoh et al. further discloses testing the minimum value against a threshold minimum value, the result further helps in deciding whether a black character area or an area other than a black character area is present (see column 30, lines 59-65 and columns 31-32, lines 65-13).

In reference to claim 11, Mutoh et al. and Ng disclose all of the claim limitations as applied to claim 6 above, in addition, Mutoh et al. discloses a color feature amount extraction circuit (#121 of Figure 19) utilizing the second plurality of pixel data, along with a first and third plurality of pixel data, to produce a maximum value calculation (see columns 29-30, lines 63-12).

In reference to claim 12, Mutoh et al. and Ng disclose all of the claim limitations as applied to claim 6 above, in addition, Mutoh et al. discloses receiving a third plurality of pixel data (pixel data for color component Y) from the line memories (see column 29, lines 51-60). Mutoh et al. discloses a color feature amount extraction circuit (#121 of Figure 19) utilizing the third plurality of pixel data, along with a first and second plurality of pixel data, to produce a maximum value calculation (see columns 29-30, lines 63-12). Mutoh et al. further discloses testing the maximum value against a threshold maximum value, the result further helps in deciding whether a black character area or an area other than a black character area is present (see column 31, lines 6-13 and columns 31-32, lines 65-13).

In reference to claim 13, Mutoh et al. and Ng disclose all of the claim limitations as applied to claim 12 above, in addition, Mutoh et al. discloses a color feature amount extraction

circuit (#121 of Figure 19) utilizing the third plurality of pixel data, along with a first and second plurality of pixel data, to produce a maximum value calculation (see columns 29-30, lines 63-12).

In reference to claim 14, claim 14 is equivalent in scope to claim 1 and therefore is rejected under similar rationale. Further, the office interprets the color judgment circuit to be functionally equivalent to the converter of claim 14 and the density difference sum calculation functionally equivalent to the separator module of applicant's claim 14.

Response to Arguments

3. Applicant's arguments, see page 8 of Applicant's Remarks, filed 10/1/2004, with respect to the objection of the specification have been fully considered. Corrections to the specification, pertaining to reference #302x and 307x of Figure 5, have been made and are accepted therefore, an objection to the specification has been withdrawn.

4. Applicant's arguments, see pages 8-10 of Applicant's Remarks, filed 10/1/2004, with respect to the rejection(s)of claim(s) 1-3, 6-8 and 11-16 under 35 U.S.C. 102(e) by Mutoh have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. Further note, arguments made by Applicant during interview conducted on 9/30/04 also contribute to the withdrawal of the rejection as applied to Mutoh. However, upon further consideration, a new ground(s) of rejection is made in view of Mutoh and Ng (U.S. Patent 5,502,793).

Allowable Subject Matter

5. Claims 4, 5, 9, 10, 17 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In reference to claims 4, 9 and 17, the prior art of record (Mutoh et al. (U.S. Patent 6,631,210 B1), Ng (U.S. Patent 5,502,793), Zhu (U.S. Patent 6,195,459 B1), Otsu et al. (U.S. Patent 6,466,693 B1), Danisewicz (U.S. Patent 6,233,353 B1) and Li et al. (U.S. Patent 6,529,629 B2)) does not explicitly disclose squaring each of the spatial gradients to generate a plurality of squared gradients and generating the first statistical characteristic by summing the squared gradients.

In reference to claims 5, 10 and 18, the prior art of record (Mutoh et al. (U.S. Patent 6,631,210 B1), Ng (U.S. Patent 5,502,793), Zhu (U.S. Patent 6,195,459 B1), Otsu et al. (U.S. Patent 6,466,693 B1), Danisewicz (U.S. Patent 6,233,353 B1) and Li et al. (U.S. Patent 6,529,629 B2)) does not explicitly disclose generating a plurality of absolute gradients by determining an absolute value of each of the spatial gradients, determining a sum value by summing the absolute gradients and generating the second statistical characteristic by squaring the sum value.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Antonio Caschera whose telephone number is (703) 305-1391. The examiner can normally be reached Monday-Thursday and alternate Fridays between 7:00 AM and 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella, can be reached at (703)-308-6829.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Matthew C. Bella

aac

11/9/04

MATTHEW C. BELLA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600